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(54) Title: METHOD FOR MANAGING WAITING LINE

(57) Abstract: A method for registering customers in a waiting line in order to receive a service includes maintaining a database of registration record each containing identification information and corresponding line management information relating to scheduling for providing the service to a customer. A request for registration in the waiting line is then received for an additional customer. The request is sent from a non-dedicated mobile communications unit via a wireless communications network, and is associated with corresponding identification information. The additional customer is registered in the waiting line by associating with the corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer, the corresponding identification information and the corresponding line management information being represented by an additional registration record added to the database. A confirmation message is then transmitted to the non-dedicated mobile communications unit via the wireless communication network.

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## METHOD FOR MANAGING WAITING LINE

FIELD AND BACKGROUND OF THE INVENTION

The present invention relates to line management and, in particular, it concerns a method for managing a line of customers interested in receiving a service  
5 so as to reduce the time actually spent waiting in a line.

In many situations, the demand for a service exceeds the rate at which a supplier is capable of providing the service. Such situations typically give rise to a waiting line (or queue) of customers waiting for their turn to receive the service. Such lines are wasteful of time and economical resources, and are frequently a cause of  
10 frustration and even discomfort for people required to wait in line.

Various arrangements exist for ameliorating at least some of the problematic aspects of lines. Most common is a ticket-based system in which each customer arriving is provided with a sequentially numbered ticket indicating his or her position in the line. The customer is then free to wait in more comfort in a designated waiting  
15 area, or even to leave briefly if time allows, until his number is reached. Nevertheless, such systems only offer a very partial solution, still requiring the physical presence of the customer to secure his position in the line such that most customers frequently opt to remain in the waiting area for most if not all of the waiting period. Additionally, such systems are subject to misuse such as by customers taking multiple tickets,  
20 reusing old tickets and the like.

An alternative approach to reducing waiting times is by requiring advance reservation of scheduled time-slots. This approach is feasible for relatively low volume, pre-planned applications such as doctors' appointments, but requires significant human resources to manage the scheduling. For higher volume, fast  
25 turn-around services, it becomes impractical to require prior reservation.

A number of systems have been proposed for line management in an attempt to reduce time wasted waiting in lines. A first example is U.S. Patent No. 5,502,806 to Mahoney et al. which proposes a system for allowing selected patrons, provided with a pre-issued card, to use a computer access terminal to select a time-slot for an  
30 amusement attraction. The patron then gains access to the attraction within the selected time-slot by entering his card in a specially designated entrance gate. The

card-holding patrons are integrated with non-card-holding patrons waiting in a conventional line.

The system of Mahoney et al. represents a considerable advance in that it offers selected patrons the possibility of avoiding waiting in line. Nevertheless, the Mahoney et al. system suffers from numerous shortcomings. Most notably, implementation of the system requires provision and distribution of specialized cards to all intended users. Additionally, the computer access terminal used to make the time-slot selection may itself become a "bottle-neck" item, requiring queuing.

A further line management system is proposed by PCT publication no. WO9718534 to Sim. This system employs dedicated wireless pager devices distributed to customers at an amusement park. The pagers are docked with a computer terminal, similar to that of Mahoney et al., where reservations are made for specific timeslots for various rides. The pagers then serve both as ID tags and to provide reminder messages before the reserved timeslots.

Here too, dedicated electronic units must be distributed to customers in order to use the system. Furthermore, the system still relies upon a physical docking procedure during which the reservation process is performed from a computer terminal. The reservations can only be performed from specific predefined locations.

There is therefore a need for a method for managing a line through which queuing time may be greatly reduced without requiring distribution of any specialized hardware and without requiring use of a dedicated reservation terminal.

### SUMMARY OF THE INVENTION

The present invention is a method for managing a line of customers interested in receiving a service.

According to the teachings of the present invention there is provided, a method for registering customers in a waiting line in order to receive a service, the method comprising: (a) maintaining in a line control unit a database containing a plurality of registration records, each of the registration records corresponding to at least one of a plurality of customers waiting to receive the service and containing: (i) identification information associated with a request for registration in the waiting line received from the corresponding at least one customer, and (ii) line management

information relating to scheduling for providing the service to the corresponding at least one customer; (b) receiving at the line control unit a request for registration in the waiting line for an additional customer sent from a non-dedicated mobile communications unit via a wireless communications network, the request for registration being associated with corresponding identification information; 5 (c) registering the additional customer in the waiting line by associating with the corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer, the corresponding identification information and the 10 corresponding line management information being represented by an additional registration record added to the database; and (d) transmitting a confirmation message to the non-dedicated mobile communications unit via the wireless communication network.

According to a further feature of the present invention, there is also stored, in 15 association with the additional management information, verification information for facilitating verification that a customer is authorized to receive the service.

According to a further feature of the present invention, the verification information is transmitted to the non-dedicated mobile communications unit as part of the confirmation message.

20 According to a further feature of the present invention, the verification information is information provided by the additional customer via the non-dedicated mobile communications unit.

According to a further feature of the present invention, the verification information is selected from the group comprising: a telephone number of the 25 non-dedicated mobile communications unit; an electronic serial number of the non-dedicated mobile communications unit; information from a SIM card associated with the non-dedicated mobile communications unit.

According to a further feature of the present invention, a service area is defined from within which reservation requests may be made; location information is 30 received from the wireless communications network indicative of a location from which the request for registration was sent; and the location information is processed to verify that the request for registration was sent from within the service area.

According to a further feature of the present invention, the data message includes information indicative of at least one user-selectable option related to the service to be provided.

There is also provided according to the teachings of the present invention, a method for registering customers in a waiting line in order to receive a service, the method comprising: (a) maintaining in a line control unit a database containing a plurality of registration records, each of the registration records corresponding to at least one of a plurality of customers waiting to receive the service and containing: (i) identification information associated with a request for registration in the waiting line received from the corresponding at least one customer, and (ii) line management information relating to scheduling for providing the service to the corresponding at least one customer; (b) receiving at the line control unit a request for registration in the waiting line for an additional customer sent via a communications network, the request for registration being associated with corresponding identification information sufficient to allow sending of a confirmation message to a specific non-dedicated mobile communications unit; (c) registering the additional customer in the waiting line by associating with the corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer, the corresponding identification information and the corresponding line management information being represented by an additional registration record added to the database; and (d) transmitting a confirmation message to the non-dedicated mobile communications unit via a wireless communications network.

Finally, there is also provided according to the teachings of the present invention, a method for registering customers in a waiting line in order to receive a service, the method comprising: (a) receiving at a line control unit a request for registration within the waiting line from at least one physical-line customer arriving at a predefined service registration point, the request for registration being associated with a registration time corresponding substantially to a time of arrival of the customer at the predefined service registration point; (b) receiving at a line control unit a request for registration within the waiting line sent from a non-dedicated mobile communications unit by at least one virtual-line customer, the request for registration being associated with a registration time corresponding substantially to a time of

receipt of the request for registration at the line control unit; and (c) allotting a waiting line position to each of the at least one physical-line customer and the at least one virtual-line customer so as to define a waiting line sequence according to which the service is to be provided to all of the at least one physical-line customer and the at  
5 least one virtual-line customer in chronological order of their corresponding registration times.

### BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

10 FIG. 1 is a flow diagram illustrating a first implementation of a method according to the teachings of the present invention for managing a line;

FIG. 2 is a schematic representation of a system for implementing the method of Figure 1;

15 FIG. 3 is a schematic representation of a sequence of operation of the system of Figure 2;

FIG. 4 is a schematic representation of operation of the system of Figure 2 illustrating integration of a "virtual line" with a "physical line";

FIG. 5 is a flow diagram illustrating a second implementation of a method according to the teachings of the present invention for managing a line; and

20 FIG. 6 is a schematic representation of a sequence of operation of an implementation of the method of Figure 5.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a method for managing a line of customers interested in receiving a service from a service supplier.

25 The principles and operation of methods according to the present invention may be better understood with reference to the drawings and the accompanying description.

Referring now to the drawings, Figures 1-6 illustrate two implementations of a system and method, constructed and operative according to the teachings of the present invention, for assigning reservations for providing customers with a service.

Generally speaking, according to a first preferred implementation, the method  
5 includes maintaining a database containing a plurality of registration records, each registration record corresponding to at least one of a plurality of customers waiting to receive the service and containing: identification information associated with a request for line registration received from the corresponding at least one customer; and line management information relating to scheduling for providing the service to  
10 the corresponding at least one customer. A line registration request for an additional customer is then received via a communications network, and in many preferred implementations from a non-dedicated mobile communications unit via a wireless communications network. The line registration request is associated with corresponding identification information. The additional customer is then registered in  
15 the line of customers by associating with the corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer. The identification information and the line management information are represented by an additional registration record added to the database. A confirmation message is then transmitted to the  
20 non-dedicated mobile communications unit.

It will be readily apparent that this method offers profound advantages over the prior art discussed above. Firstly, by employing standard, non-dedicated mobile communications units, the need to purchase, maintain and distribute dedicated mobile units is avoided. At the same time, the system allows reservations to be made very  
25 simply via the wireless communications network, in many cases by performing a single step send operation. This avoids the need for docking the mobile units and circumvents the use of a dedicated computer terminal for making reservations. As a result, all of the likely logistical bottlenecks of the prior art reservation systems are typically completely avoided. These and other advantages of the present invention  
30 will become clearer from the following detailed description.

Before addressing the features of the present invention in detail, it will be helpful to define certain terminology as it is to be used herein in the description and claims. Firstly, it should be appreciated that the present invention is applicable to

almost all situations in which a plurality of customers are interested in receiving a service. The term "service" in the context of the present invention is used to refer to any service including, but not limited to: a performance or show to be attended by a customer; any activity to be performed by a customer; and any products, food, service, or information to be provided or dispensed to a customer. The service may be a non-profit service such as a government office or a public service department. Primarily, however, the present invention is thought to be of particular importance when applied to commercial services of a wide range of types. Particularly preferred applications include entertainments in an amusement park, shows, service oriented industries, government offices, fast food services and restaurants.

The term "send operation" is used to refer to any operation used to initiate a communication from a mobile communications unit via a wireless communications network to a remote device, independent of the communications protocol used, and independent of what other networks take part in the connection. Examples of a "send operation" include, but are not limited to, a dialing operation, sending of a text message, and requesting a connection to an internet address.

Without in any way limiting the scope of applicability of the present invention, the invention will be presented herein by reference to a relatively small number of non-limiting examples. Specifically, with reference to Figures 1-4, a first implementation of the invention will be described. This implementation operates as a replacement for, or supplement to, a conventional queuing arrangement in a wide range of applications. Then, with reference to Figures 5 and 6, a second extended implementation will be described. This extended implementation allows the customer to select various user-definable options while making the reservation.

Turning now to Figures 1-4, there is illustrated a first preferred implementation of the method of the present invention, generally designated 10 in Figure 1, and a corresponding system, generally designated 100 in Figure 2. In this example, a number of steps, grouped together as block 12, make up a registration or reservation procedure which may be performed without physically joining a line or approaching any dedicated reservation station. The service is subsequently provided (block 14) according to allotted scheduling data after a straight forward verification step, substantially eliminating the time wastage and inconvenience of waiting in line.



In more detail, turning to the steps of reservation procedure 12, the reservation is here preferably initiated by the user performing a predefined send operation 16 using a non-dedicated mobile communications unit 102 via a wireless communications network 104. Most preferably, the present invention is implemented using cellular wireless communications networks and corresponding cellular mobile communications units. As mentioned above, the "send operation" is defined broadly, typical examples including a dialing operation, sending of a text message, and requesting a connection to an internet address. For any given service, the required type of send operation and corresponding destination address is made available to the customers. Thus, in a first preferred case, the send operation is performed by dialing a predefined number. In a second preferred case, the send operation is performed by sending a text message or other data message to a predefined address, which may be a telephone number, an email address or any other messaging system address supported by the network. The address itself may be an address within the wireless communications network, or any other address accessible via the wireless communications network via another network such as the internet 106 or a conventional telephone network 108.

In this basic implementation, the requested service is preferably fully and uniquely specified by the destination address. In other words, the customer is here required simply to perform the send operation, without needing to supply any additional information.

It should be noted that the address used for the present invention may optionally be a shortened address or "local address" which is not unique as a telephone number. In this case, the address is interpreted by the wireless communications network on the basis of location information available to the network. Thus, depending upon the resolution of the available location information, a number of three, or even two, digits may be sufficient to specify the desired service on the basis of information as to the current location of the mobile communications unit.

Optionally, more than one type of send operation may be allowed to initiate a reservation for a single service. Thus, in one preferred case, a reservation may be initiated by either dialing or sending a text message to a predefined number. This is particularly valuable to allow use of the system by mobile communication units with

differing capabilities. Similarly, a single line management system may be configured to receive line registration requests from a number of separate communications networks so as to accommodate customers who subscribe to each of the different communications networks.

5        In most preferred implementations, send operation 16 results in identification information being received at a line control unit (LCU) 110 from wireless communications network 104 (step 18a) without requiring any separate action by the customer. The identification information for such an implementation is preferably information characteristic of the hardware configuration of the non-dedicated mobile  
10        communications unit 102 used for the send operation which is inherently made available to the wireless communications network as a result of the send operation. Preferred examples of such identification information include, but are not limited to, a telephone number of non-dedicated mobile communications unit 102, an electronic serial number of non-dedicated mobile communications unit 102, and an identifier or  
15        other information from a SIM card associated with non-dedicated mobile communications unit 102. Alternatively, the identification information may be provided intentionally by the user at the time of sending the line registration request. In each case, however, the identification information stored is preferably sufficient to allow the line control unit to properly address a return message to the non-dedicated  
20        mobile communications unit.

      The identification information may optionally be supplemented by other information included by the customer in the send operation or retrieved from the communications network. By way of example, according to one preferred set of implementations, line control unit 110 also receives location information (step 18b)  
25        indicative of the location of mobile communications unit 102 when send operation 16 was performed. The term "location" in this context is used broadly to indicate any indication of location independent of the resolution with which the location is indicated. Thus, in a basic implementation, the location information may simply be an indication of a cell of a cellular communications network from within which the send  
30        operation was performed. In many cases, much higher resolution location information is available from the network, or in certain cases from an integrated global positioning system (GPS).

Optionally, in the case that location information is retrieved from the network, reservation requests may be processed conditionally based upon the location from which the send operation was performed. For example, in the case of rides within an amusement park, it may be preferable to restrict reservations to customers already present within the park to avoid unfair pre-booking. In this case, a "service area" from within which reservation requests may be made is defined in advance (step 20) and the location information for each reservation request is processed (step 22) to verify that the send operation was performed within the service area. Any reservation requests received from outside the service area are typically disregarded, optionally being answered by an appropriate notification sent from line control unit 110 via wireless communications network 104.

Parenthetically, it is noted that, in a local addressing system in which non-unique addresses are interpreted by the wireless communications network 104 on the basis of the location of the mobile communications unit, reservation requests may be inherently limited by the network itself to a predefined service area.

Alternatively, in certain implementation, the line registration request may be submitted via another type of communications network, such as from a telephone 105 via a public service telephone network 108 or from a computer 103 connected to a computer network (e.g., internet) 106. In this case, the customer must supply sufficient identification information to allow the system to send a confirmation message to his or her mobile communications unit in order to complete the registration procedure.

Once the reservation request, including suitable identification data, has been received, and optionally subject to the aforementioned service area restriction, a reservation is made at step 24 by associating the identification information with scheduling data relating to scheduling for providing the service to the holder of the non-dedicated mobile communications unit 102. This step is typically implemented by storing a reservation record containing the identification information and the scheduling data in a database located and maintained in a suitable data storage means such as storage device 110a of line control unit 110. It should be noted in this context that specific detail of the implementation of line control unit, both in terms of hardware and associated software, are not critical to the present invention and will not

be described herein. Numerous implementations for providing the various features described herein are readily within the capabilities of one ordinarily skilled in the art.

In a related issue, it should be noted that line control unit 110 may be located either on-site, for example in a single unit with a service control unit such as an automated gate, or at a remote site. The latter option would enable a single centralized line control unit, for example managed by a service provider, to manage scheduling data for multiple lines. Only the specific information required at any given time for verification need then be forwarded from the line control unit to a service control unit (gate, display sign system etc.) at the site at which the service is provided.

The scheduling data may be any data which relates to the scheduling with which the service is to be provided to the customer, either in terms of timing or in terms of priority relative to other customers. Thus, according to a first preferred implementation, the scheduling data includes a number indicating a sequential position of the customer within a line of customers waiting for the service. This case closely parallels the functionality of a conventional line, where customers are processed sequentially in order of entry into the line. At the same time, the disadvantages of a line which requires physical presence of the customer to secure his or her place are avoided. This is particularly true according to a preferred option in which advance notification is given via the wireless communications network, as will be described below.

According to a second preferred implementation, the scheduling data includes scheduling information indicative of an expected time at which the service will be available to the customer. This case is particularly useful when providing services for which scheduling is generally predictable, for example, for amusement park rides of a known fixed duration.

It should be noted that the method and system of the present invention may be implemented independently from other lines, or may be integrated together with conventional lines of customers. In the case of an independent system, customers waiting in the "virtual line" provided by the present invention may be the only customers waiting to receive the service, or may be processed in parallel to one or more conventional lines of customers. In such a case, the scheduling data is typically derived exclusively on the basis of reservation requests previously received by line control unit 110 and any advance scheduling information which is available with

regard to the rate or schedule for providing the service. The customers in the "virtual line" may then be processed, either with the same priority or, at the service provider's discretion, with a different priority or at a different rate, from customers waiting in a line on site.

5 In a case where customers from the "virtual line" are to be integrated with a line of customers waiting in a conventional line, it is preferable to collect line status information relating to a number of customers currently waiting in a line for the service. The scheduling data is then advantageously derived, at least in part, from the line status information at the time the identification information is received.

10 By way of example, Figure 2 shows a case where a conventional line employs a waiting area 112 interposed between two gates 114 and 116. Gate 114 is a gate immediately prior to provision of the service, in this case an entertainment at an amusement park, and provides an indication of the number of customers who have been provided the service. Gate 116 is an additional numerator gate deployed to count  
15 customers entering line waiting area 112. Thus, the difference between the number of customers who have passed through gates 116 and 114 indicates the number of customers currently waiting in the line to be used as the aforementioned "line status information". A similar effect may be achieved by requiring customers in the physical line to take tickets or the like when entering the waiting line, thereby providing an  
20 opportunity to count customers in the line without requiring gate 116.

A second case illustrated in Figure 2 shows an example of an implementation of the method of the present invention for service in a fast food without the availability of line status information. In such a case, customers are typically taken alternately from physical-line gate 114a and virtual-line gate 118a.

25 It will be clear to one ordinarily skilled in the art that line status information of the type mentioned may be used in a number of ways during allocation of scheduling data. In one simple example, sequential line position numbers may be allotted to reservation requests so that a customer in the virtual line is allocated a position in line immediately after the customers already waiting in the physical line on site. In a  
30 second example, relative priorities (i.e., the ratio of rates at which customers are served) between the customers in the physical line and the virtual line may be scaled in proportion to the total numbers of customers waiting in the two lines. Details of the specific criteria or algorithms for allotting scheduling data to each reservation clearly

vary between applications, and may readily be chosen by one ordinarily skilled in the art for each specific application.

Once a reservation has been made, the line control unit 110 preferably transmits a confirmation message (step 26) via wireless communications network 104  
5 back to mobile communications unit 102. This message is sent in a format and according to a communications protocol suited to the capabilities of the mobile communications unit 102, and may include a voice message, a text message and/or a graphic. Preferably, the message includes information relating to the scheduling data, such as the allotted line position number, scheduled time and/or any other pertinent  
10 information regarding scheduling and notifications. According to a further preferred option, the confirmation message may include a confirmation code or graphic to be used in a verification step to be described below.

At this point, the reservation sequence 12 is complete and the customer is free to move around freely and proceed with other activities until shortly before the  
15 service is to be provided.

Turning now to the procedure 14 associated with providing the service, it is a preferred feature of most implementations of the present invention that line control unit 110 sends an advance notification (step 28) via wireless communications network 104 to mobile communications unit 102. Specifically, line control unit 110 preferably  
20 derives an expected time at which the service will be available to the customer, and transmits a notification message to communications unit 102 a predefined period before the expected time. This minimizes the likelihood of turns being missed.

While the advance notification feature is thought to be advantageous in all implementations of the present invention, it is particularly valuable in cases where the  
25 scheduling data is in the form of sequentially numbered positions in a line. In the latter case, although the time of providing the service is not accurately predicted, the customer has the peace of mind to know that he will receive an advance warning prior to reaching his turn. This frees him from the burden of periodically checking progress of the line, allowing him to use his waiting time productively for other activities.

30 With regard to the timing of the advance notification in the case of sequentially numbered positions in a line, this may be done in a number of ways. In most cases, the notification is sent when the line position currently being served is a predetermined number before the line position of the user to be notified. Optionally,

where the rate of providing the service varies significantly, such as where the number of staff providing a service periodically increases or decreases, the number of turns prior warning may be automatically adjusted on the basis of the rate of progress of the line (averaged over a given period). This ensures that the advance notification always corresponds approximately to a desired advance notification period.

It is a particularly preferred feature of most preferred implementations of the method of the present invention that a verification step 30 is performed prior to providing the service. The purpose of verification step 30 is to verify that the customer about to be provided with the service is authorized to receive the service. This may be achieved in a number of ways, and using various different information, as will now be discussed.

Firstly, in the case of a service which is to be provided by a human service provider interacting with the customer, the service provider may conveniently perform the verification step immediately prior to providing the service. In the case of controlled admission to a restricted-access area within which the service is provided, the verification step may be performed either at a manned gate or checkpoint, or at an automatic gate 118.

In a case where verification is performed by a person, such as at a manned gate, verification is preferably performed by requiring the customer to provide confirmation information previously transmitted to the mobile communications unit, typically as part of step 26 described above. This confirmation information may take various forms including, but not limited to, a graphic element displayable on a display of the communications unit, an alphanumeric code, or a sound code. Alternatively, verification may be performed by requiring the customer to reproduce information provided by the customer as part of the send operation. This could be a customer-selected PIN number, credit card number or other code requested from, or defined by, the customer, which is stored together with the reservation record in the line management unit 110.

Most of the aforementioned verification options may also be implemented with an automated gate by providing a keyboard or other data input device to allow the user to enter the required information to gain entry. Additional options for implementing verification at an automated gate include, but are not limited to: positioning a display of the communications unit opposite an optical reader to allow

optical reading of a confirmation code or graphic; playing a sound code corresponding to the confirmation information which may be verified using a microphone and a sound processing system; employing a magnetic card reader (especially where the verification information is a credit card number); and receiving information  
5 transmitted from the communications unit via a short range wireless communications link. The last option facilitates verification performed by comparing the identification information directly with corresponding information input from the communications unit, or sent as part of the confirmation message.

Once the customer has passed the verification requirements, the requested  
10 service is then provided at step 32.

Turning briefly to Figure 3, this illustrates schematically the sequence of operation of the method of Figure 1 in two applications, namely, a doctor's surgery and a spider show. Firstly, at step 40, information is provided to potential customers that reservations may be made for the doctor by dialing 558 and for the spider show  
15 by dialing 559. A customer (in this case a "patient") interested to visit the doctor dials 558 on his non-dedicated communications unit 102 and presses "send"/"dial" as indicated at 42. Line control unit 110 then receives the connection request, including identification information characteristic of the mobile communications unit 102, and identifies the request on the basis of the number dialed as a doctor's appointment  
20 request.

Line control unit 110 then associates scheduling data, in this case a sequential line number "25", with the identification information to make a reservation and sends a confirmation message to the mobile communications unit 102. Various options for the confirmation message content are illustrated at 44a-44d. Specifically, 44a  
25 illustrates a basic message including merely the line number "25". Message 44b additionally includes an estimated time for the appointment. Message 44c provides information regarding provision of a reminder notification. Message 44d includes a graphic design which serves as deterrent to would-be cheats who might attempt to falsify a text-only message in order to skip the line. Clearly, other forms of  
30 verification such as were discussed above may also readily be incorporated here.

After suitable advance notification where provided, the patient arrives in a waiting area shortly before a current line number display 46 indicates that his turn has been reached. When number "25" is displayed, the patient enters the doctor's office



48 and presents the doctor with his confirmation message for verification before the examination commences.

Also illustrated in Figure 3 is a confirmation message 50 for a reservation for the spider show (placed by dialing 559). In this case, the message includes a time for receiving the service, a four-digit verification code, and a distinctive graphic (spider design). The verification code is required to gain entry via an unmanned automated gate 52 to the spider show 54.

Turning now to Figure 4, it should be appreciated that the present invention readily provides for complete integration of a "virtual line" (i.e., customers registering remotely) with a "physical line" of customers arriving in a designated waiting area to receive a service. Specifically, in the example shown, line positions (or time slots) are allotted to customers in a physical line on the basis of their time of arrival to at least one predefined service registration point 92 associated with a line control unit 110. This time of arrival is considered the "registration time" for that customer. The time is typically established by a registration operation which may be taking of a ticket, passing a magnetic card or optically-coded card through an appropriate card reader, or any other registration procedure performed automatically or manually (i.e., by a person).

In parallel, line positions (or time slots) are allotted to customers joining through the "virtual line", such as by sending a line registration request to line control unit 110 from non-dedicated mobile communications unit 102. In the case of the virtual-line customers, the "registration time" is defined as the time of receipt of the line registration request.

The line positions are preferably allotted so as to define a sequence according to which the service is provided to both the physical-line customers and the virtual-line customers in chronological order of their corresponding registration times. This ensures fair integration of all customers, independent of the route they choose for registering in the line. At the same time, customers in the "virtual line" benefit from all the advantages of advance notification which allows them the freedom to engage in other activities until their turn or time-slot approaches.

Turning now to Figures 5 and 6, there is shown an extended implementation 60 of the method of the present invention which allows for the selection of a number of user-selectable options related to the service to be provided. Generally speaking,

method 60 is similar to method 10, but includes a number of additional steps. Accordingly, for conciseness of presentation, steps common to both implementations will be similarly labeled and will only be discussed to the extent that they differ from those described above.

5 It is a particularly preferred feature of this implementation that send operation 16 is effective not only to initiate the reservation but also to specify at least one user-selectable option related to the service to be provided. The options may relate to the content of the service itself, such as food items from a menu, and/or to parameters related to the order such as preferred scheduling for the reservation or the number of  
10 reservations being made.

Although not limited to text messaging, this implementation is thought to be advantageously implemented using the already well-developed text messaging capabilities of many existing communications units. Accordingly, this implementation will be illustrated herein by way of a non-limiting example based on text messaging.

15 Thus, send operation 16 is here preferably performed by sending a text or other data message to a predefined address, the message including information indicative of at least one user-selectable option related to the service to be provided. Whereas in method 10 above, the content of the message is typically disregarded, in this case the content is received at line control unit 110 (step 18c) and processed at  
20 step 62 to determine what options have been selected, and whether the selection is valid.

Optionally, a list of available options may be provided in a manner independent of the communications network such as, for example, by publicizing instructions on posters or in newspapers or the like. Alternatively, or additionally, the  
25 method provides a list of available options directly to the mobile communications unit 102 such as via text messaging.

According to one particularly preferred option, the text message is processed at step 62 to determine whether it includes a predefined minimum quantity of selection information required to generate a valid reservation/order. In the event that  
30 the text message does not include sufficient selection information to be a valid reservation, a list of available options is transmitted to the customer via the wireless communications network (step 64) to guide the customer in preparing a new valid reservation request. This provides a particularly useful function, allowing the

customer to intentionally send an "invalid" text message, or preferably to merely dial the number, as a "menu request" to prompt the system to provide a list of available options.

5 The method then optionally proceeds with location verification 22 as described above. In step 24, the option selection information is typically stored alongside the identification data and scheduling data to form complete reservation records.

10 Preferably, a confirmation message transmitted to the customer in step 26 includes confirmation of the selected options. Typically, for reasons of ease of data entry, the option selection information is defined in terms of a numerical code corresponding to each available option. In this case, it is a particularly preferred feature of the present invention that the confirmation message transmitted to the customer via the communications network includes a verbal message indicative of an option corresponding to the selected codes.

15 In many cases, the user-selected options require the service provider to begin preparation a certain period in advance of providing the service. In such cases, the selected options are processed (step 66) as soon as the order is finalized.

The sequence 14 of providing the service is typically substantially as described above with reference to implementation 10.

20 Turning now to Figure 6, there is shown a practical example of method 60 as applied to a fast food service. Firstly, a sign on the wall 70 or elsewhere indicates that the "smart line" may be accessed by dialing 558. Dialing or sending a text message to 558 prompts sending of a menu 72 to mobile communications unit 102. Alternatively, or additionally, the menu may also appear as a sign allowing immediate ordering by  
25 the customer. The customer then sends a reply text message 74 containing codes for the required items. The syntax for ordering is preferably kept as simple as possible, but may include quantities of each item such as shown here. Optionally, other information may be required for identification or as security. In this case, a credit card number has been required to secure the order. Then, the order is sent as a text message  
30 to the smart line access number (screen 76).

Line control unit 110 then sends a confirmation message 78 to the mobile communications unit 102. The confirmation message may include any desired information about the order, preferably including pricing information and scheduling

information. According to the preferred feature described above, the confirmation also includes a "translation" of the order codes into words, thereby ensuring that any mistakes in the use of menu item codes are identified immediately. Optionally, additional messages, such as bonus coupon 80 or other special offer or the like may  
5 also be forwarded to the customer.

Once the order is complete, line control unit 110 forwards details of at least some of the options 82 to the kitchen 84 of the fast food establishment for processing. In this case, details of options requiring advance preparation (burgers, nuggets etc.) are forwarded while ready-to-serve options (drinks etc.) are left for dispensing at the  
10 service counter.

Finally, after suitable advance notification 88 and/or "order ready" notification 90 if desired, the customer proceeds to the service counter where his complete order details are displayed 86. By this time, the order is already ready for collection and payment can be quickly finalized to complete the transaction without waiting in line.

15 It should be noted that the examples described herein are intended only to be illustrative of the principles of the present invention, while it is envisaged and expected that practical implementations will differ in various ways from the examples given, according to the requirements for each given application. For example, it is possible that the aforementioned confirmation process may be subdivided into two  
20 steps, the first being a tentative confirmation of the content of an order and being subject to a further reply to finalize the order.

It will be appreciated that the above descriptions are intended only to serve as examples, and that many other embodiments are possible within the spirit and the scope of the present invention.

## WHAT IS CLAIMED IS:

1. A method for registering customers in a waiting line in order to receive a service, the method comprising:

- (a) maintaining in a line control unit a database containing a plurality of registration records, each of said registration records corresponding to at least one of a plurality of customers waiting to receive the service and containing:
  - (i) identification information associated with a request for registration in the waiting line received from said corresponding at least one customer, and
  - (ii) line management information relating to scheduling for providing the service to said corresponding at least one customer;
- (b) receiving at said line control unit a request for registration in the waiting line for an additional customer sent from a non-dedicated mobile communications unit via a wireless communications network, said request for registration being associated with corresponding identification information;
- (c) registering the additional customer in the waiting line by associating with said corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer, said corresponding identification information and said corresponding line management information being represented by an additional registration record added to said database; and
- (d) transmitting a confirmation message to said non-dedicated mobile communications unit via said wireless communication network.

2. The method of claim 1, further comprising storing, in association with said additional management information, verification information for facilitating verification that a customer is authorized to receive the service.

3. The method of claim 2, wherein said verification information is transmitted to said non-dedicated mobile communications unit as part of said confirmation message.
4. The method of claim 2, wherein said verification information is information provided by the additional customer via said non-dedicated mobile communications unit.
5. The method of claim 2, wherein said verification information is selected from the group comprising: a telephone number of said non-dedicated mobile communications unit; an electronic serial number of said non-dedicated mobile communications unit; information from a SIM card associated with said non-dedicated mobile communications unit.
6. The method of claim 2, further comprising verifying, prior to providing the service to the customer, that the customer is authorized to receive the service by receiving information from an information-carrying card associated with said verification information.
7. The method of claim 6, wherein said information-carrying card is a credit card.
8. The method of claim 2, further comprising verifying, prior to providing the service to the customer, that the customer is authorized to receive the service by receiving information transmitted from said non-dedicated mobile communications unit via a short range wireless communications link and comparing said information with said verification information.
9. The method of claim 2, further comprising verifying, prior to providing the service to the customer, that the customer is authorized to receive the service by requiring the customer to provide confirmation information corresponding to said verification information.

10. The method of claim 9, wherein said confirmation information corresponds to a graphic element transmitted to said non-dedicated mobile communications unit as part of said confirmation message and displayable on a display of said non-dedicated mobile communications unit.

11. The method of claim 9, wherein said confirmation information corresponds to an alphanumeric code.

12. The method of claim 9, wherein said confirmation information corresponds to a sound code.

13. The method of claim 1, wherein said additional identification information is forwarded as a result solely of a send operation performed using said non-dedicated mobile communications unit.

14. The method of claim 1, further comprising:

- (a) defining a service area from within which reservation requests may be made;
- (b) receiving from said wireless communications network location information indicative of a location from which said request for registration was sent; and
- (c) processing said location information to verify that said request for registration was sent from within said service area.

15. The method of claim 1, wherein said identification information includes a telephone number of the mobile communications unit.

16. The method of claim 1, wherein said identification information includes an electronic serial number of the mobile communications unit.

17. The method of claim 1, wherein said identification information includes an identifier from a SIM card associated with the mobile communications unit.

18. The method of claim 1, wherein said line registration request is made by dialing a predefined telephone number.

19. The method of claim 1, wherein said line registration request is made by sending a data message to a predefined address.

20. The method of claim 19, wherein said data message is sent using a protocol which allows graphic content.

21. The method of claim 19, wherein said data message includes information indicative of at least one user-selectable option related to the service to be provided.

22. The method of claim 20, wherein said information indicative of at least one user-selectable option is at least one code corresponding to at least one option selected from a plurality of available options, the method further comprising:

- (a) translating said at least one code into at least one verbal indication of said at least one selected option; and
- (b) transmitting said at least one verbal indication to said non-dedicated mobile communications unit.

23. The method of claim 20, further comprising transmitting to said non-dedicated mobile communications unit a list of available options.

24. The method of claim 19, further comprising:

- (a) processing said data message to determine whether said data message includes selection information indicative of at least one user-selectable option related to the service to be provided; and



- (b) in the event that said data message does not include said selection information, transmitting to said non-dedicated mobile communications unit a list of available options.

25. The method of claim 1, wherein said line management information includes a number indicating a sequential position of the additional customer within the waiting line.

26. The method of claim 25, further comprising:

- (a) monitoring a current service position corresponding to the sequential position of a customer currently receiving the service; and
- (b) transmitting a notification message to said non-dedicated mobile communications unit when said current service position is a predefined number of positions before said position number of said additional customer.

27. The method of claim 1, wherein said line management information is exclusively a number indicating a sequential position of the customer within a line of customers waiting for the service.

28. The method of claim 1, wherein said line management information includes scheduling information indicative of an expected time at which the service will be available to the customer.

29. The method of claim 1, wherein said confirmation message includes information corresponding to said line management information.

30. The method of claim 1, further comprising:

- (a) deriving an expected time at which the service will be available to the customer; and
- (b) transmitting a notification message to said mobile communications unit a predefined period before said expected time.

31. The method of claim 1, further comprising collecting line status information relating to a number of customers currently present in a line of customers waiting for the service within a predefined waiting area, said additional scheduling data being derived, at least in part, from said line status information at the time said line registration request is received.

32. The method of claim 31, wherein said line status information is generated by use of a numerator gate system deployed to count customers entering said predefined waiting area.

33. The method of claim 1, wherein said service is an entertainment in an amusement park.

34. The method of claim 1, wherein said service is a show.

35. The method of claim 1, wherein said service is a fast food service.

36. The method of claim 1, wherein said service is a restaurant service.

37. The method of claim 1, wherein said service is a service provided by a public service sector.

38. The method of claim 1, wherein said service is a service provided by a private service sector.

39. A method for registering customers in a waiting line in order to receive a service, the method comprising:

- (a) maintaining in a line control unit a database containing a plurality of registration records, each of said registration records corresponding to at least one of a plurality of customers waiting to receive the service and containing:

- (i) identification information associated with a request for registration in the waiting line received from said corresponding at least one customer, and
  - (ii) line management information relating to scheduling for providing the service to said corresponding at least one customer;
- (b) receiving at said line control unit a request for registration in the waiting line for an additional customer sent via a communications network, said request for registration being associated with corresponding identification information sufficient to allow sending of a confirmation message to a specific non-dedicated mobile communications unit;
- (c) registering the additional customer in the waiting line by associating with said corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the service to the additional customer, said corresponding identification information and said corresponding line management information being represented by an additional registration record added to said database; and
- (d) transmitting a confirmation message to said non-dedicated mobile communications unit via a wireless communications network.

40. The method of claim 39, wherein said communications network is a public service telephone network.

41. The method of claim 39, wherein said communications network is an internet network.

42. The method of claim 39, wherein said communications network is a cellular network.

43. The method of claim 39, wherein said identification information is a telephone number of said non-dedicated mobile communications unit.

44. The method of claim 39, wherein said non-dedicated mobile communications unit is a cellular mobile communications unit.

45. The method of claim 39, further comprising storing, in association with said corresponding line management information, verification information for facilitating verification that a customer is authorized to receive the service.

46. The method of claim 45, wherein said verification information is transmitted to said non-dedicated mobile communications unit as part of said confirmation message.

47. The method of claim 45, further comprising verifying, prior to providing the service to the customer, that the customer is authorized to receive the service by requiring the customer to provide confirmation information corresponding to said verification information.

48. The method of claim 47, wherein said confirmation information corresponds to a graphic element transmitted to said non-dedicated mobile communications unit as part of said confirmation message and displayable on a display of said non-dedicated mobile communications unit.

49. The method of claim 47, wherein said confirmation information corresponds to an alphanumeric code.

50. The method of claim 39, wherein said line management information includes a number indicating a sequential position of the additional customer within a line of customers waiting for the service.

51. The method of claim 50, further comprising:

- (a) monitoring a current service position corresponding to the sequential position of a customer currently receiving the service; and
- (b) transmitting a notification message to said non-dedicated mobile communications unit when said current service position is a predefined number of positions before said position number of said additional customer.

52. The method of claim 39, further comprising:

- (a) deriving an expected time at which the service will be available to the customer; and
- (b) transmitting a notification message to said mobile communications unit a predefined period before said expected time.

53. A method for registering customers in a waiting line in order to receive a service, the method comprising:

- (a) receiving at a line control unit a request for registration within the waiting line from at least one physical-line customer arriving at a predefined service registration point, said request for registration being associated with a registration time corresponding substantially to a time of arrival of said customer at said predefined service registration point;
- (b) receiving at a line control unit a request for registration within the waiting line sent from a non-dedicated mobile communications unit by at least one virtual-line customer, said request for registration being associated with a registration time corresponding substantially to a time of receipt of said request for registration at said line control unit; and
- (c) allotting a waiting line position to each of said at least one physical-line customer and said at least one virtual-line customer so as to define a waiting line sequence according to which the service is to be provided to all of said at least one physical-line customer and said at least one virtual-line customer in chronological order of their corresponding registration times.

54. The method of claim 53, wherein said waiting line position corresponds to an estimated time at which the service will be available to a corresponding user.

55. The method of claim 53, wherein said waiting line position includes a sequential position of the corresponding user within said sequence.

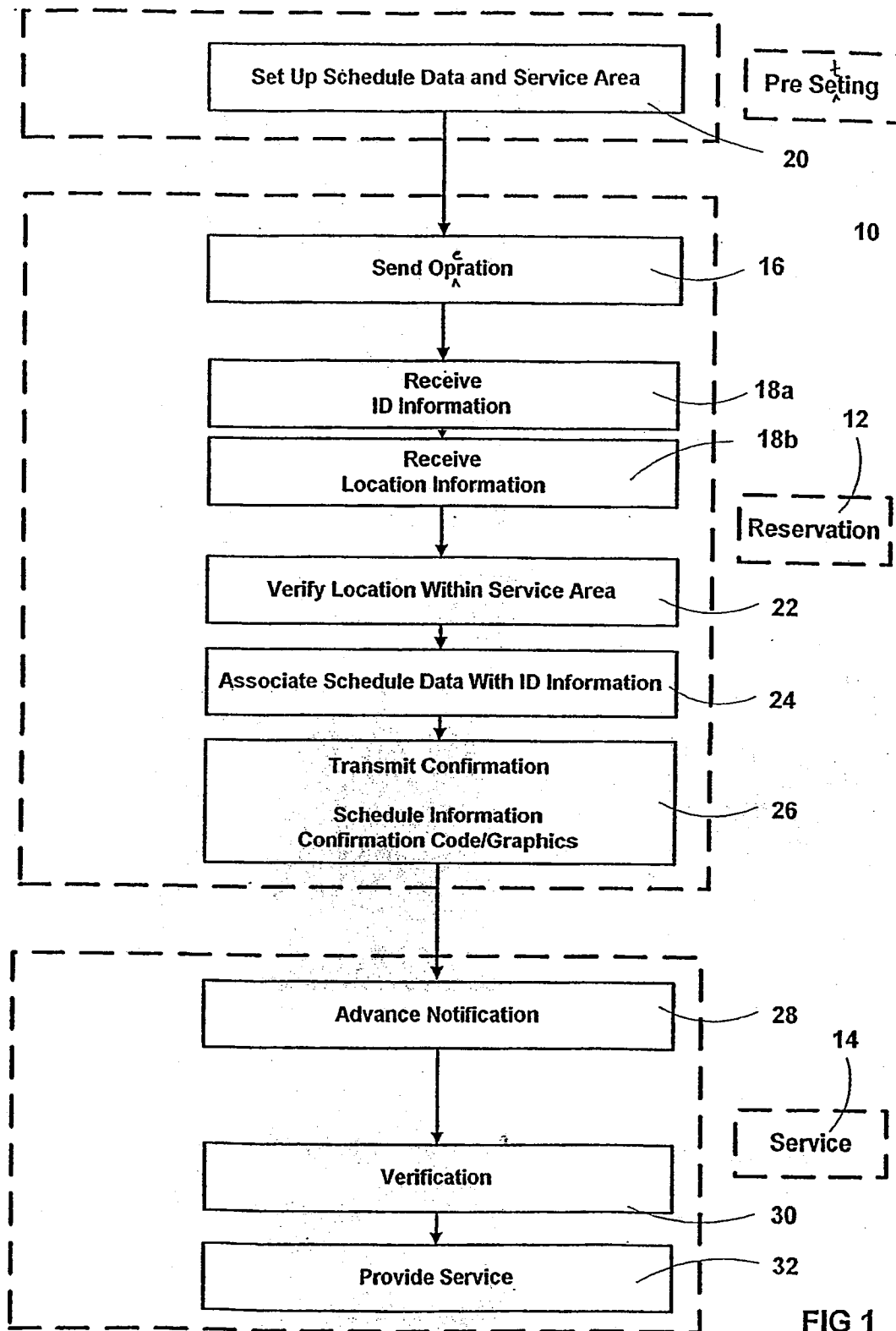


FIG 1

FIG 2

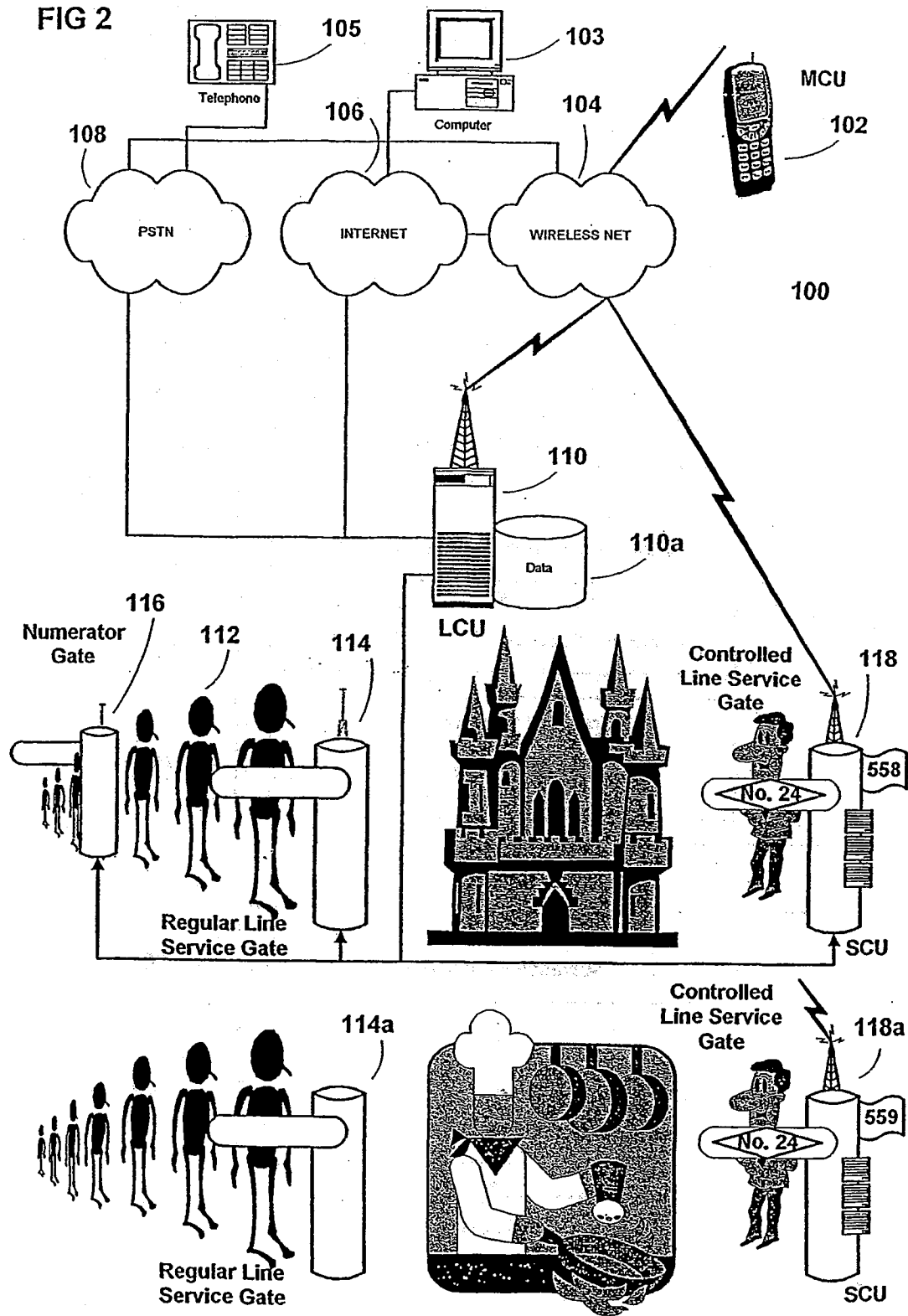
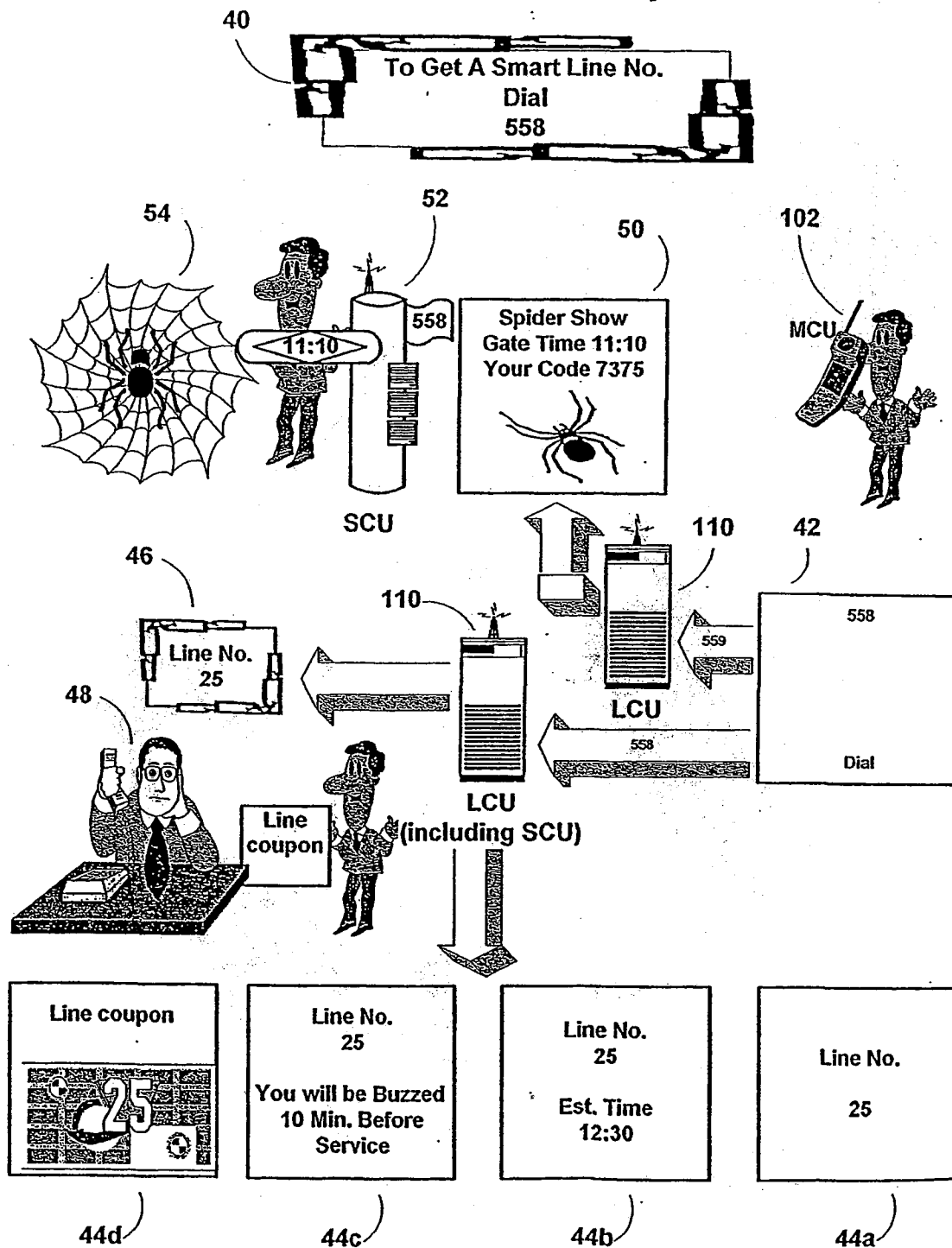
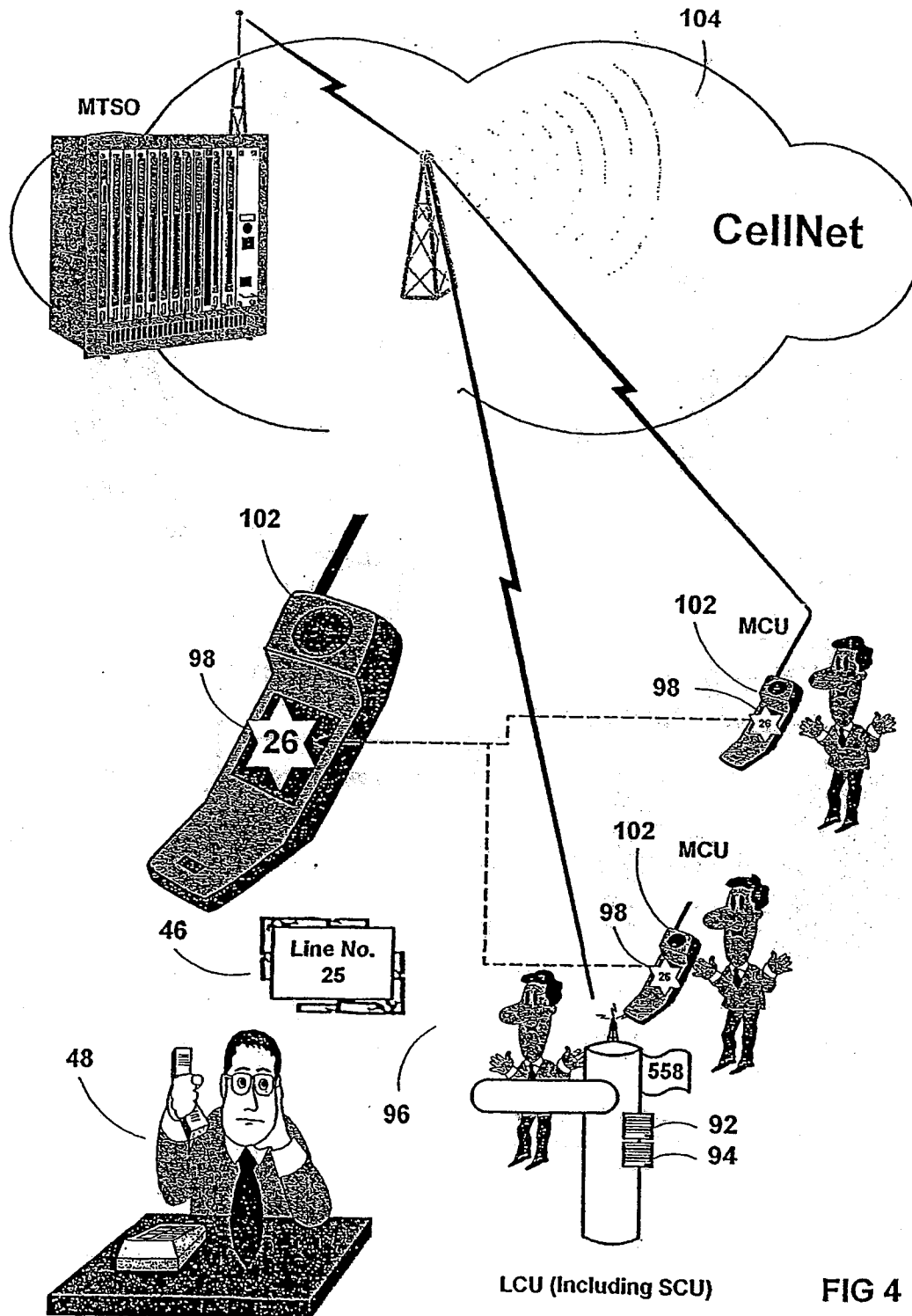




FIG 3

## The SmartLine Cycle





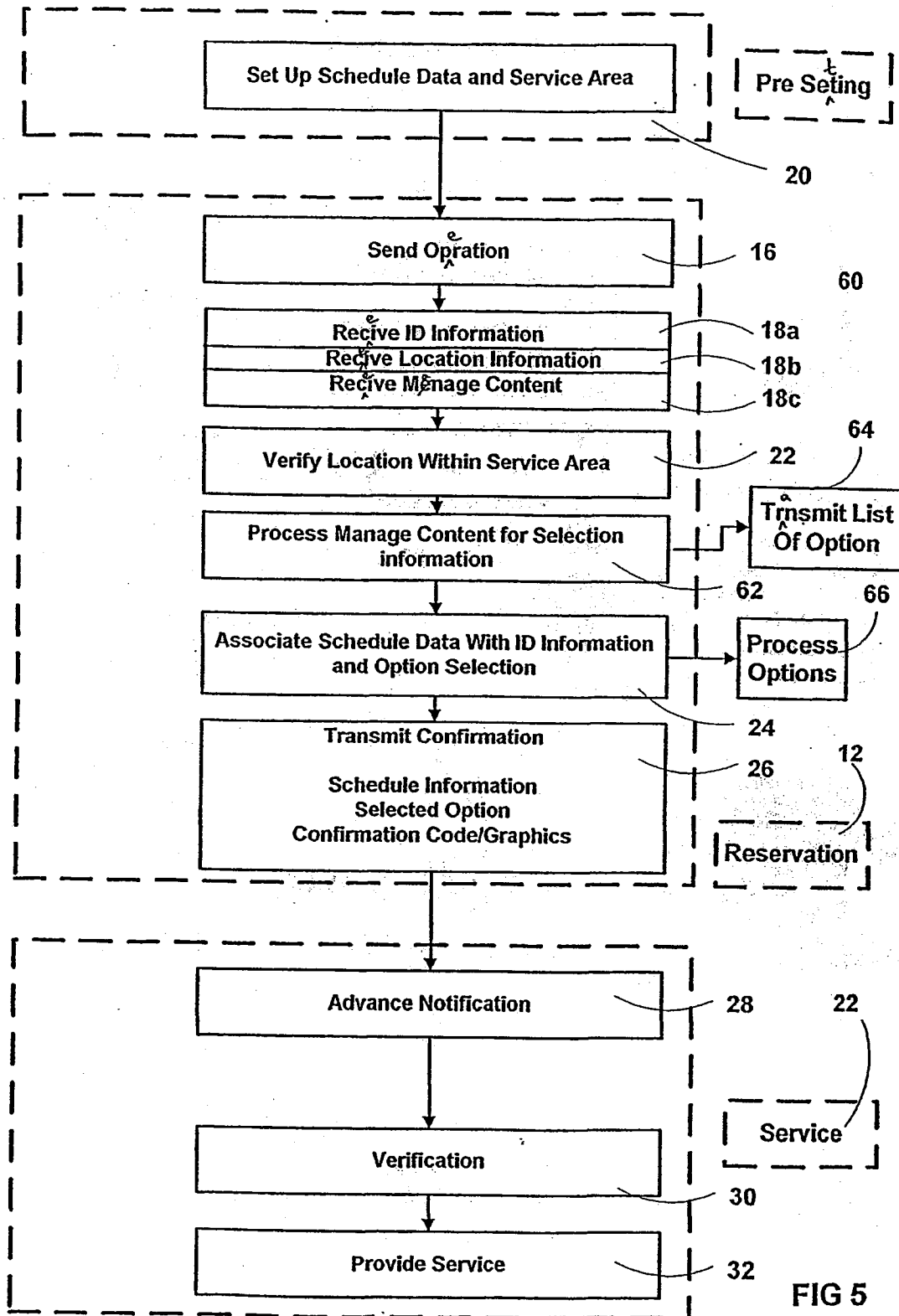


FIG 5

6/6

## The Fast Food Cycle

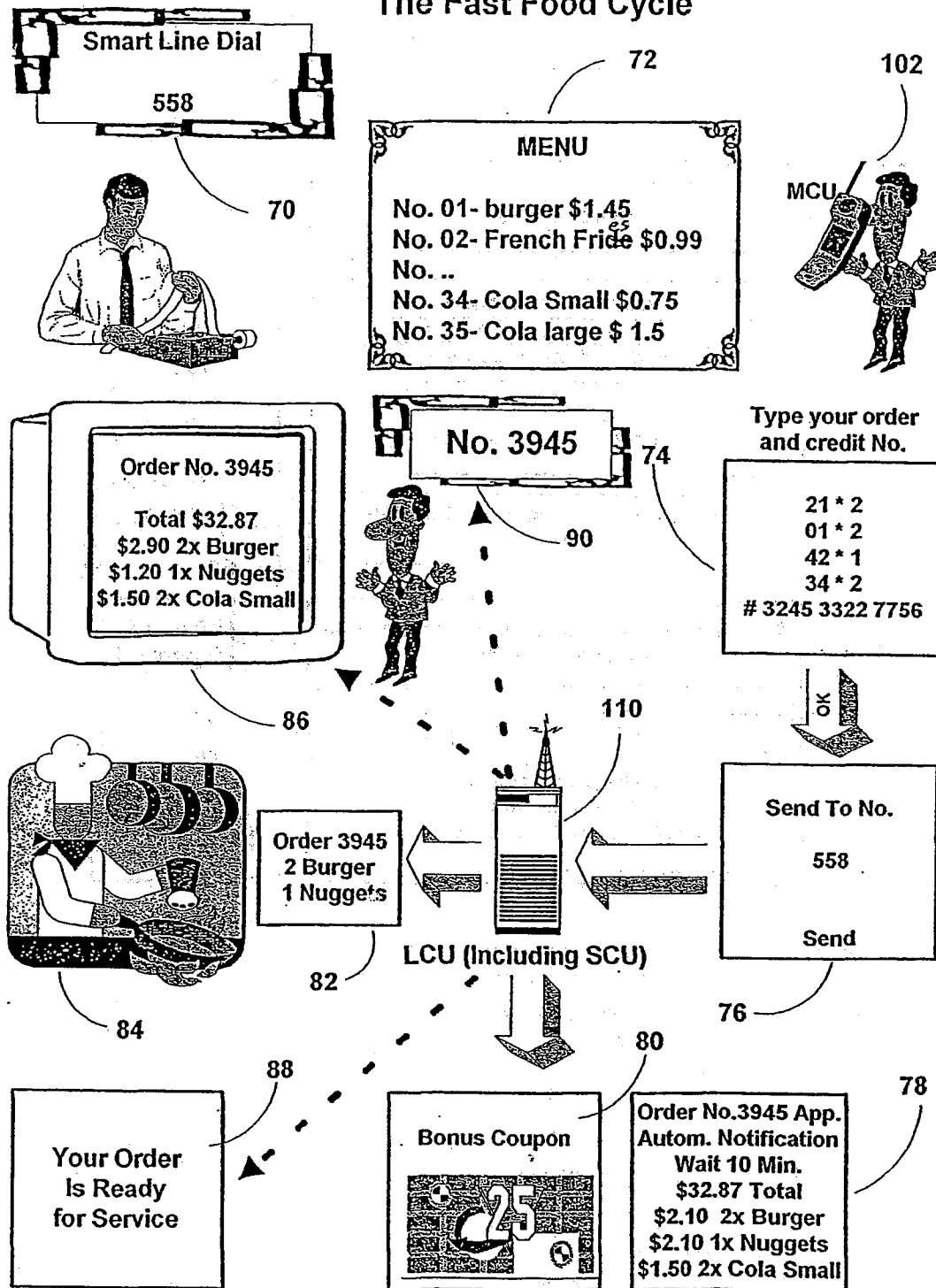


FIG 6

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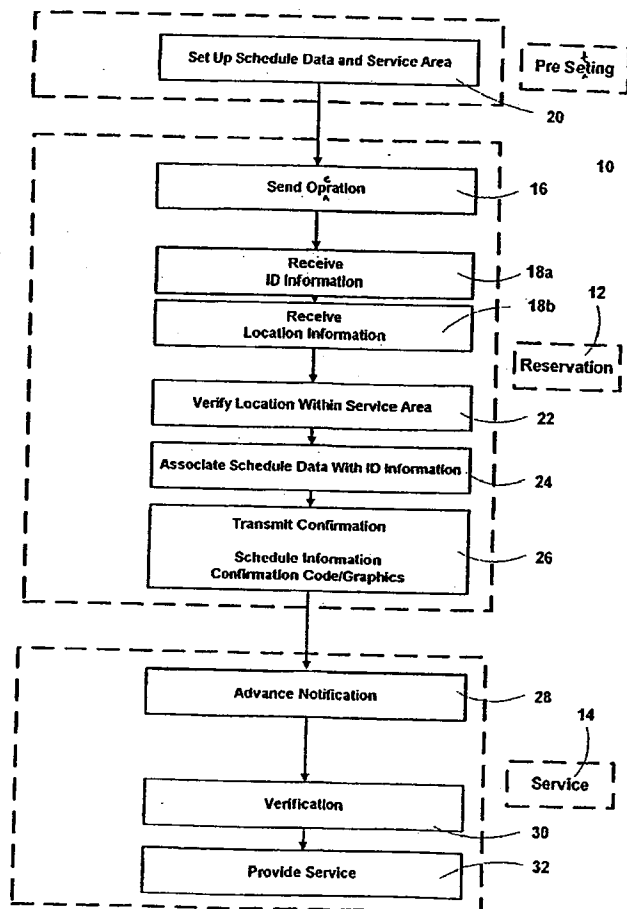
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[Continued on next page]

(54) Title: METHOD FOR MANAGING WAITING LINE



(57) Abstract: A method for registering customers in a waiting line in order to receive a service includes maintaining a database of registration records each containing identification information and corresponding line management information relating to scheduling for providing the service to a customer. A request for registration in the waiting line is then received for an additional customer. The request is sent from a non-dedicated mobile communications unit via a wireless communications network, and is associated with corresponding identification information. The additional customer is registered in the waiting line by associating with the corresponding identification information at least one item of corresponding line management information relating to scheduling for providing the services to the additional customer, the corresponding identification information and the corresponding line management information being represented by an additional registration record added to the database. A confirmation message is then transmitted to the non-dedicated mobile communications unit via the wireless communication network (1).

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60

US CL : 705/1, 8, 9

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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/1, 8, 9

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,502,806 A (MAHONEY et al) 26 March 1996 (26.03.1996), see entire document.	1-55
Y	US 5,987,421 A (CHUANG) 16 November 1999 (16.02.1999), see entire document.	1-55
Y	US 6,173,209 B1 (LAVAL et al) 09 January 2001 (09.01.2001), see entire document.	1-55
Y,E	US 6,363,351 B1 (MORO) 26 March 2002 (26.03.2002), see entire document.	1-55
Y,P	US 2001/0014866 A1 (CONMY et al) 16 August 2001 (16.08.2001), see abstract.	1

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## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Y,P	US 2001/0039514 A1 (BARENBAUM et al.) 08 November 2001(08.11.2001), see entire document.	1-55



# INTERNATIONAL SEARCH REPORT

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**Continuation of B. FIELDS SEARCHED Item 3:**  
**USPAT**

"Waiting Line Management", "Queuing Arrangement", "Reservation Allotment", "Scheduling."

